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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,590	08/23/2001	Hyong-Gon Lee	06192.0205.NPUS00	8630

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EXAMINER

NGUYEN, FRANCIS N

ART UNIT	PAPER NUMBER
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2674

DATE MAILED: 01/28/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/934,590

Applicant(s)

LEE, HYONG-GON

Examiner

FRANCIS NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4-18 is/are rejected.
- 7) ☐ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendment filed on 5/16/2003 is entered.

Claim Objections

2. Claims 2, 3, 4, 8, 9, 10, 12, 13, 14, 15 are objected to because of the following informalities: incorrect term “by” (Amendment , page 2, claim 2, line 1-2) , incorrect terms operation nTFT and still TFT without specific definition (Amendment, claim 3, page 3, lines 13 and 16, also claim 9, page 5, line 18, page 6, line 1) also numerous syntax errors due to amended terms “ is/are” throughout claim 3, incorrect term “when” (page 3, claim 4, line 3) , incorrect location of term LCD (page 5, claim 8, line 1), incorrect term level-up pTFT (claim 10, page 6, line 7), incorrect phrase “in a liquid crystal display(LCD) panel **driving method...** , an LCD **driving method**” (Amendment A, page 7, line 2), also missing word “a” before “liquid”, stops the image signals to display the same, incorrect terms nTFT and pTFT(page 5, claim 9, line 8) incorrect term “when” (page 7, claim 13, line 3), incorrect phrase “and the second inverter circuit (page 5, claim 9, line 14), incorrect word “by” (claim 14, page 7, line 2). It is strongly suggested that claims 3, 9, 10, 12 be rewritten completely due to numerous aforementioned errors and lack of consistency (especially claims 3, 9, 10 with markup version and clean version being inconsistent). An interview is also strongly suggested . Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5-11, 14-15, 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 5 is indefinite because phrase "selectively transmitting according to a difference between the image signals and the third power" (page 4, lines 13-14) is unclear as to what is being transmitted selectively, what is exactly the difference between image signals and the third power, also phrase " lifting the high state by as much as the second power" (page 4, claim 5, lines 15-16) is not clear as to what is as much as the second power.

6. Claim 18 recites the limitation " the scanning signal" (page 8, claim 18, line 7). There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Akiyama et al.(US Patent 5,977,940).

As to **claim 16**, Akiyama et al. discloses a liquid crystal display (LCD), comprising :

a scan signal line (gate line 9, figure 1A);

a source signal line (signal line 8, figure 1A);

a pixel switch (transistor 1, figure 1A) for selectively outputting image signals;

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a power unit for supplying a first power, a second power and a third power to pixels (figure 1A indicates each pixel comprises a comparator and waveform shaper 4, this implies power unit has to exist for supplying them power, also note column 12, power of driver circuits can be turned off, column 12, line 32) ;

a first control signal line (Css line shown in figure 9) for transmitting a first control signal to the pixels;

a second control signal line (Inversion signal line 112 shown in figure 6, column 16, lines 13-14) for transmitting a second control signal to the pixels; and

a level shift unit in electrical communication with the second control signal for generating an inverting signal (inverting circuit 103 with polarity inverter 105, column 15, lines 49-50 in electrical communication with inversion signal line via flipflop 107 shown in figure 6).

As to **claim 17**, a liquid crystal display of claim 16, wherein the level shifting unit outputs the generated inverting signal (column 15, lines 60-62).

As to **claim 18**, Akiyama et al. discloses a liquid crystal display, comprising:

a scan driver (gate line driving circuit 903 in figure 9) activated to supply scanning signals for a first period and inactivated for a second period (relevant scanning line driving is stopped, column 12, lines 26-27) ;

a source driver (signal line driving circuit 902 shown in figure 9) activated to supply image signals for the first period and inactivated for the second period (relevant signal line driver is stopped, column 12, lines 28-29); and

a plurality of pixels (column 17, lines 57-58), each pixel including a liquid crystal capacitor (liquid crystal 5 shown in figure 1A) displaying an image, a pixel switch (transistor 9 shown in

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figure 1A) for transmitting the image signals in response to the scanning signal, and a memory cell storing and transmitting the image signal from the pixel switch to the liquid crystal capacitor (memory 202 shown in figure 7) during the first period and providing at least one of the stored image signal and an inversion signal to the stored image signal (polarity inverter 105, figure 6, column 15, lines 49-50) for the liquid crystal capacitor during the second period (after data signals are written to the storage capacitors, column 12, lines 25-27).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1, 2, 4-8, 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama et al. (US Patent 5,977,940).

As to **claim 1**, Akiyama et al. discloses a liquid crystal display, comprising:

a scan signal line (gate line 9 Gn shown in figure 1A) for supplying scanning signals to pixels;

a source signal line (signal line Sm 8 shown in figure 1A) for supplying image pixels to a third electrode from a first electrode connected to the source signal line;

a pixel switch (switch 801 shown in figure 8) for outputting the image signals to a third electrode;

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a power unit for respectively supplying first power and second power to all pixels (Note figure 1A indicates that each pixel comprises a comparator and waveform shaper 4, this implies power unit has to exist for supplying them power, also note column 12, power of driver circuits can be turned off, column 12, line 32);

a control signal line unit respectively including a first control signal line (C_{ss} line shown in figure 6) for transmitting a first control signal line to all pixels, and a second control signal line (Inversion signal line 112 shown in figure 6) for transmitting a second control signal to all pixels;

a liquid crystal unit (liquid crystal layer 5, column 10, lines 29-30) for selectively transmitting according to voltage difference between the image signals and the second power;

a memory cell unit (memory 803 shown in figure 8).

However, Akiyama et al. fails to expressly teach memory cell unit for receiving the first control signal and the second control signal from the control signal line unit. Note V_{ref} and V_{cs} are received by block 15 as shown in figure 1A/B. It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the apparatus Akiyama et al. then modify the control signal line unit to provide control of memory cell 803 to obtain the apparatus Akiyama et al. modified because it would accommodate driving of still image and moving image signals, and facilitate reduction of power of LCD driver.

As to **claim 2**, the liquid crystal display of claim 1, wherein said operation mode image signal (data signal is supplied to the pixel, column 9, lines 57-58, also) is transmitted to the liquid crystal unit (liquid crystal 5, figure 1A), when the first control signal is in low state and the second control signal is in high state, and when the first control signal is in high state. Akiyama

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et al. fails to expressly teach when the first control signal is in low state and the second control signal is in high state, and when the first control signal is in high state. Since Akiyama et al. teaches still picture and moving picture as shown in figure 9, switching transistor 802 controlling memory 803 shown in figure 8, it is obvious to one skilled in the art to vary control signals V_{ref} and V_{cs} in order to drive the liquid crystal 5.

As to **claim 4**, the liquid crystal display (LCD) of claim 1, wherein the control signal line unit transmits control signals sequentially delayed by a buffer circuit to corresponding pixel areas where the pixel area of the LCD panel is divided into at least two portions (buffer circuit has to exist in LCD driving circuit shown in figure 9 in order to remove noise, LCD panel 901 is divided into pixel arrays by signal lines 8 and gate lines 9, column 9, lines 47-54).

As to **claim 5**, Akiyama et al. discloses a low power liquid crystal display (LCD), comprising:

a scan signal line (gate line 9, figure 1A);

a source signal line (signal line 8, figure 1A);

a pixel switch (transistor 1, figure 1A) for selectively outputting image signals;

a control signal line unit including a first control signal line (C_{ss} line 111 shown in figure 6, column 16, lines 33-34) and a second control signal line (Inversion signal line 112 shown in figure 6, column 16, lines 13-14);

a liquid crystal unit (liquid crystal 5 shown in figure 1A) for selectively transmitting according to a difference between the image signals (inversion of data signal to pixel electrode 114 shown in figure 6, column 15, lines 40-41) and the third power (V_{com} shown in figure 6).

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a level shift unit for receiving the second control signal (inverting circuit 103 with polarity inverter 105, column 15, lines 49-50 indirectly receiving inversion signal line 112 via flipflop 107 in figure 6) for generating an inverting signal (output of inverting circuit 105 shown in figure 6), and outputting the inverting signal (signal input to switch 106b in figure 6).

For rejection purpose, it is interpreted that the data signal corresponds to the output of the comparator 3 of figure 1A that becomes high (column 10, lines 61-62), that the second power corresponds to that of waveshaper 4 of figure 1B and this corresponds to the claimed "lifting the high state by as much as the second power". However, Akiyama et al. fails to expressly teach a power unit for supplying a first power, a second power and a third power to all pixels from outside of a pixel area of the LCD panel. Note figure 1A indicates each pixel comprises a comparator and waveform shaper 4, also note column 12, power of driver circuits can be turned off, column 12, line 32, opposite electrode driving circuit 904 providing voltage V_{com} shown in figure 9 and V_{com} corresponds to the claimed third power . It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the apparatus Akiyama et al. then provide a power unit for supplying a first power and a second power in order to energize the comparator and waveshaper for driving the LCD with AC voltage in order to reduce power consumption.

As to **claim 6**, the liquid crystal display (LCD) of claim 5, further comprising a memory cell unit (memory 803, figure 8).

As to **claim 7**, the liquid crystal display of claim 6, wherein the memory cell unit receives the first and second control signals from the control signal line unit (note V_{ref} and V_{cs} being

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received by block 15 as shown in figure 1A/B) and receiving the inverting signal of the second control signal output by the level shift unit (column 15, lines 60-62).

As to **claim 8**, the liquid crystal display (LCD) of claim 7, wherein an operation mode image signal is selectively output to a third electrode of the pixel switch (scanning signal activates switching transistor 1 shown in figure 6, column 9, lines 57-59) and the operation mode signal is selectively transmitted to the liquid crystal unit (waveform shaper 4 output to the liquid crystal 5, as shown in figure 1A) .

As to **claim 11**, the liquid crystal display (LCD) of claim 5, wherein the control signal line unit transmits respective control signals sequentially delayed by a buffer circuit to corresponding pixel areas when the pixel area of the LCD panel is divided into at least two portions (buffer circuit has to exist in LCD driving circuit shown in figure 9 in order to remove noise, LCD panel 901 is divided into pixel arrays by signal lines 8 and gate lines 9, column 9, lines 47-54).

As to **claim 12**, Akiyama et al. discloses in a liquid crystal display (LCD) panel comprising a pixel switch (transistor 1 shown in figure 1A) that receives scanning signals and image signals from scanning lines and source signal lines (column 9, lines 47-48) to output the image signals to a memory cell unit (memory 803 shown in figure 8), an LCD driving method comprising:

the memory cell unit (memory 803 shown in figure 8) transmitting operation mode signals output by the pixel switch to liquid crystal and display the same (data signal for moving picture, column 18, lines 5-7) ; and

transmitting either a still mode image signal (data signal is supplied to the pixel , column 9, lines 57-58, figure 9 indicates still picture as input signals) output by a third

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electrode of the pixel switch or its inverting signal (polarity inverter 105, column 15, lines 49-50) to the liquid crystal (AC voltage applied to liquid crystal, column 3, lines 23-24 DC) as the second control signal periodically repeats low and high states (V_r is AC voltage as shown in figures 11C/D) to fit characteristics of an LCD panel.

However, Akiyama et al. fails to expressly teach when the first control signal is in low state and the second control signal is in high state. One skilled in the art would know how to selectively control a memory cell in order to read/write. Note that Akiyama et al. teaches different image signals from still picture and moving picture (figure 9). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the method Akiyama et al. then provide selective control of the memory in order to accommodate driving the LCD with plurality of image signal types (still picture and moving picture).

As to **claim 13**, the method of claim 12, wherein the method further comprises transmitting respective control signals sequentially delayed by a buffer circuit to a corresponding pixel area where the pixel area of the LCD panel is divided into at least two portions in either a horizontal or vertical direction (buffer circuit has to exist in LCD driving circuit shown in figure 9 in order to remove noise, LCD panel 901 is divided into pixel arrays by signal lines 8 and gate lines 9, column 9, lines 47-54).

As to **claim 14**, the liquid crystal display of claim 7, wherein a still mode image signal (still picture from memory 908 of figure 9) is selectively output to the third electrode of the pixel switch (column 9, lines 57-59).

As to **claim 15**, the liquid crystal display of claim 7, wherein an inverting signal is selectively transmitted to the liquid crystal unit as the second control signal periodically repeats the low

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and high states (Akiyama et al. teaches V_{ref} in form of alternating signal shown in figure 11C, this implies still picture driving signal is periodically inverted) according to characteristics of the LCD panel.

Response to Arguments

11. Applicant's arguments filed on 5/16/2003 have been fully considered but they are moot in view of new ground of rejection.

Allowable Subject Matter

12. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Note also the claim objections in paragraph 2 above.

Claims 9,10 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Note also the claim objections in paragraph 2 above.

CONCLUSION

13. The prior art made of record but not relied upon is pertinent to Applicant's disclosure

US Patent	Sato et al.	5,712,652
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US Patent	Ishii	6,636,194
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Reference Sato et al. is made of record as it discloses a liquid crystal display device comprising a memory element in each pixel.

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Reference Ishii is made of record as it discloses a display device comprising a memory element in each pixel.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **FRANCIS N NGUYEN** whose telephone number is **703 308-8858**. The examiner can normally be reached during hours 8:00 AM- 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **RICHARD A HJERPE** can be reached at 703 305-4709.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231


or faxed to:

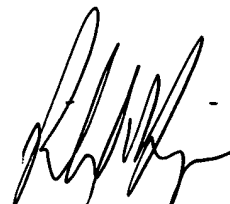
(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service whose telephone number is (703) 306-0377.

January 22nd, 2004


FRANCIS N NGUYEN
Examiner
Art Unit 2674


RICHARD HJERPE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600